

WE CLAIM:

1 1. In a networked communication system that does not require reliable
2 networking connections and which includes a first communication node and a second
3 communication node, wherein the communication nodes employ wireless communication
4 when within communication range, a method for replicating data by employing opportunistic
5 data transfer between the communication nodes to propagate redundant copies of the data,
6 the method comprising the steps for:

7 using a first monitor at the first node and a second monitor at the second node
8 to determine when the first and second nodes are within communication range,
9 wherein at least one of the first and second nodes is mobile;

10 creating a dynamic connection between the first and second nodes while in
11 communication range; and

12 replicating data across the dynamic connection.

1 2. A method as recited in claim 1, wherein the step for replicating includes
2 comparing data stored locally at the first node with data stored locally at the second node.

1 3. A method as recited in claim 2, wherein if the data stored at the first node
2 includes information that is not stored at the second node, the step for replicating includes
3 storing a copy of the non-stored information at the second node.

1 4. A method as recited in claim 3, wherein the non-stored information includes
2 an instruction to delete information.

1 5. A method as recited in claim 4, wherein the non-stored information includes
2 an instruction to modify information.

1 6. A method as recited in claim 2, wherein the first node includes a first
2 opportunistic data transfer protocol component and the second node includes a second
3 opportunistic data transfer protocol component.

1 7. A method as recited in claim 6, wherein the first and second opportunistic
2 data transfer components perform the steps for using the first and second monitors and for
3 creating the dynamic connection.

1 8. A method as recited in claim 7, further including the steps for:
2 using the first and second monitors and a third monitor at a third node to
3 determine when the first, second and third nodes are within communication range,
4 wherein the third node includes a third opportunistic data transfer protocol
5 component, and wherein at least one of the first, second and third nodes is mobile;
6 and
7 including the third node in the dynamic connection.

1 9. A method as recited in claim 8, wherein the step for replicating data includes
2 replicating data among the first, second and third nodes.

1 10. A method as recited in claim 9, wherein when at least one of the first, second
2 and third nodes is no longer within communication range, excluding the at least one node
3 from the dynamic connection.

1 11. A method as recited in claim 10, wherein when the at least one node is again
2 within communication range, including the at least one node in the dynamic connection and
3 continuing to replicate data with the at least one node across the dynamic connection.

1 12. A method as recited in claim 7, wherein when the dynamic connection is
2 disconnected and the first node is within communication range of a fourth node that includes
3 a fourth opportunistic data transfer component and a fourth monitor, performing the steps
4 for:

5 creating a second dynamic connection between the first and fourth nodes
6 while the nodes are within communication range; and
7 replicating data across the second dynamic connection.

1 13. A method as recited in claim 12, wherein the fourth node is an intended
2 archival system that includes a storage device.

1 14. A method as recited in claim 13, wherein if the data stored at the first node
2 includes information that is not preserved at the fourth node, the step for replicating includes
3 storing an archival copy of the non-preserved information at the fourth node, and wherein
4 when the non-preserved information is stored at the fourth node, initiating instructions from
5 the fourth node to the first node to delete the non-preserved information.

1 15. A method as recited in claim 14, wherein the fourth node is mobile.

1 16. A method as recited in claim 15, wherein when the first and fourth nodes are
2 no longer within communication range, disconnecting the second dynamic connection.

1 17. A method as recited in claim 16, wherein when the first node is within
2 communication range with a fifth node that includes a fifth monitor and a fifth opportunistic
3 data transfer protocol component, performing the steps for:

4 creating a third dynamic connection between the first and fifth nodes while
5 in communication range; and

6 replicating data across the third dynamic connection, including deleting any
7 non-preserved information at the fifth node.

1 18. A method as recited in claim 17, wherein the second and fifth nodes are the
2 same node.

1 19. A dynamically mobile data communication system for use in moving data and
2 facilitating the arrival of data at an intended archival location, the system comprising:

3 a plurality of communication nodes capable of employing wireless
4 communication, wherein at least one of the nodes is mobile;

5 a storage device located at each of the nodes; and

6 an opportunistic data transfer protocol component located at each of the
7 nodes, wherein when two or more of the nodes are within communication range, the
8 component at each of the two or more nodes creates a dynamic connection for
9 communication among the two or more nodes so long as the two or more nodes are
10 within communication range.

1 20. A dynamically mobile data communication system as recited in claim 19,
2 wherein at least one of the plurality of communication nodes is an intended archival system.

1 21. A dynamically mobile data communication system as recited in claim 20,
2 wherein at least one of the plurality of communication nodes gathers data.

1 22. A dynamically mobile data communication system as recited in claim 21,
2 wherein when the dynamic connection is created between at least two nodes of the plurality
3 of nodes, data is replicated among the at least two nodes to provide a redundant copy of data
4 at each of the at least two nodes.

1 23. A dynamically mobile data communication system as recited in claim 22,
2 wherein the data is transmitted in segments.

1 24. A dynamically mobile data communication system as recited in claim 22,
2 wherein the intended archival system propagates an instruction to one or more nodes of the
3 plurality of nodes to delete data from each of the one or more nodes.

1 25. A dynamically mobile data communication system as recited in claim 24,
2 wherein the instructions to delete are propagated upon creating a subsequent dynamic
3 connection between two or more nodes of the plurality of nodes, wherein at least one of the
4 two or more nodes includes the instruction to delete and issues the instruction to each of the
5 two or more nodes of the subsequent dynamic connection.

1 26. A dynamically mobile data communication system as recited in claim 25,
2 wherein when high priority data is gathered, transmitting the high priority data to a desired
3 location through the use of a secure link.

1 27. A dynamically mobile data communication system as recited in claim 26,
2 wherein the secure link includes one of a cellular link and a satellite link.

1 28. A dynamically mobile data communication system as recited in claim 27,
2 wherein the high priority data is transferred in real-time.

3 29. A computer program product for implementing a method of opportunistic data
4 transfer in a dynamically networked system, the computer program product comprising:

5 a computer-readable medium carrying computer executable instructions for
6 performing the method, wherein the method comprises the steps for:

7 determining whether a first communication node and a second
8 communication node are within communication range, wherein if the first
9 and second nodes are within communication range, performing the steps for:

10 creating a dynamic network between the first and second
11 nodes;

12 determining whether the first and second nodes are privileged
13 for data replication;

14 if the first and second nodes are determined to be privileged
15 for data replication, performing the steps for:

16 comparing data stored at the first node with data
17 stored at the second node;

18 if the data stored at the first node includes information
19 that is not stored at the second node, replicating the non-
20 stored information for storage at the second node; and

21 if the data stored at the second node includes
22 information not included in the data stored at the first node,
23 transferring the non-included information for storage at the
24 first node; and

25 if the first and second nodes are not determined to be
26 privileged for data exchange, performing the step for disconnecting
27 the dynamic network.

1 30. A computer program product as recited in claim 29, wherein the non-stored
2 information and the non-included information include one or more commands to modify
3 data.

1 31. A computer program product as recited in claim 30, wherein the commands
2 to modify include one or more commands to delete data.

1 32. A computer program product as recited in claim 31, wherein the step for
2 comparing data includes comparing data headers.

1 33. A computer program product as recited in claim 31, wherein the step for
2 comparing data includes comparing file directory information.

1 34. A computer program product as recited in claim 31, wherein the method
2 further comprises the steps for:

3 determining whether data is high priority data; and

4 if the data is high priority data, using a secure link to transmit the high
5 priority data to an intended location.

6 35. A computer program product as recited in claim 34, wherein the secure link
7 includes one of a cellular link, and a satellite link.

1 36. In a dynamic communication system that includes a plurality of
2 communication nodes, where at least one of the nodes is mobile, a method for replicating
3 data by employing opportunistic data transfer, the method comprising the acts of:

4 determining whether a first communication node and a second
5 communication node are within communication range, wherein the first
6 communication node is mobile; and wherein if the first and second nodes are within
7 communication range, performing the acts of:

8 creating a dynamic network between the first and second nodes;

9 determining whether the first and second nodes are privileged for data
10 replication;

11 if the first and second nodes are determined to be privileged for data
12 replication, performing the acts of:

13 comparing data stored at the first node with data stored at the
14 second node;

15 if the data stored at the first node includes information that is
16 not stored at the second node, replicating the non-stored information
17 for storage at the second node; and

18 if the data stored at the second node includes information not
19 included in the data stored at the first node, transferring the non-
20 included information for storage at the first node; and
21 if the first and second nodes are not determined to be privileged for
22 data exchange, performing the act of disconnecting the dynamic network.

1 37. A method as recited in claim 36, wherein the non-stored information and the
2 non-included information include one or more commands to modify data.

1 38. A method as recited in claim 37, wherein the one or more commands to
2 modify data include one or more commands to delete data.

1 39. A method as recited in claim 38, wherein the step for comparing data includes
2 comparing data headers.

1 40. A computer program product as recited in claim 39, wherein the method
2 further comprises the steps for:

3 determining whether data is high priority data; and

4 if the data is high priority data, using a secure link to transmit the high
5 priority data to an intended location.

1 41. A computer program product as recited in claim 40, wherein the secure link
2 includes one of a cellular link, and a satellite link.